

AMENDMENTS TO THE CLAIMS IN CLEAN VERSION

All claims 1-34 are shown below to be examined or reexamined. Please also insert new claims 35-67 also presented for examination and allowance. If there are any discrepancies between a marked up amended claim and a clean version of that claim, and Applicant is not aware of any, the clean version supercedes the marked up version, as the clean version is the one which Applicant wants examined and issued in the Patent. Thank you.

1. (twice amended) An image controller comprising:
 - a first input member positioned to activate first input member sensors, said first input member moveable on at least two axes;
 - a second input member positioned to activate second input member sensors, said second input member moveable on at least two axes;
 - a plurality of finger depressible button input members positioned to activate button input member sensors;
 - a circuit board sheet structurally connecting, at least in part, said first input member sensors to said second input member sensors;
 - said image controller is connected to an image generation device;
 - at least one of the button input member sensors is a pressure-sensitive variable sensor, whereby depression of at least one of the finger depressible button input members provides a proportional signal representing a level of depressive pressure applied; and
 - active tactile feedback as a component of said controller for providing vibration to be felt by a hand operating said controller, said active tactile feedback comprising a motor and a weight.

2. (once amended) An image controller according to claim 1 in which said sheet also connects, at least in part, to at least one of said button input member sensors.

3. (twice amended) An image controller comprising:
a first input member controllable by a human hand on at least two axes, said first input member structured to activate a first set of sensors; and
a second input member controllable by a human hand on at least two axes, said second input member structured to activate a second set of sensors;
a plurality of finger depressible button input members, said finger depressible button input members structured to activate a third set of sensors; and
a circuit board connects the first set, the second set and the third set of the sensors.

4. (once amended) An image controller according to claim 3 in which said at least one of the finger depressible button input members is associated with a pressure-sensitive variable sensor, whereby depression of said at least one of the finger depressible button input members provides a proportional signal representing a level of depressive pressure applied.

5. (twice amended) An image controller according to claim 3 wherein said image controller further comprises an active tactile feedback motor which rotates an offset weight.

6. (once amended) An image controller according to claim 5 wherein said circuit board has electrical circuit traces and an application specific integrated circuit chip located on said circuit board.

7. (once amended) An image controller according to claim 6 wherein said at least one of the finger depressible button input members is associated with a pressure-sensitive variable sensor, whereby depression of said at least one of the finger depressible buttons provides a proportional signal representing a level of depressive pressure applied.

8. (twice amended) An image controller comprising:
a first input member with associated sensors, said first input member moveable on at least two axes;
a second input member with associated sensors, said second input member moveable on at least two axes; and
at least four independent finger depressible buttons with associated sensors; and
a circuit board sheet connects to the sensors of the input members and the sensors of said finger depressible buttons.

9. (twice amended) An image controller according to claim 8 in which at least one of the finger depressible buttons is structured with a resilient dome cap, and said image controller further comprises active tactile feedback structure mounted as a component of said controller for providing vibration to be felt by a hand operating said controller.

10. An image controller according to claim 9 in which said image controller is connected to an image generation device.

11. An image controller according to claim 10 in which said image generation device includes a television based electronic game.

12. (once amended) An image controller according to claim 11 wherein said active tactile feedback structure comprises an electric motor with offset weight.

13. An image controller according to claim 12 in which a plunger is positioned above said dome cap, said plunger comprising a non-conductive rigid plastic material.

14. (twice amended) An image controller according to claim 9 in which said at least one of the finger depressible buttons is a variably depressible button associated with a variable sensor for providing a proportional signal, wherein depression of said variably depressible button provides a proportional signal representing variable depression of said variably depressible button.

15. (once amended) An image controller according to claim 14 wherein said variable sensor is a pressure-sensitive variable sensor.

16. (once amended) An image controller according to claim 15 in which said circuit board sheet supports an application specific integrated circuit.

17. (once amended) An image controller according to claim 8 in which said image controller further comprises a second circuit board sheet.

18. (once amended) An image controller according to claim 17 further comprising active tactile feedback provided by a motor and offset weight.

19. (once amended) An image controller according to claim 17 in which said at least one of the finger depressible buttons is associated with a pressure-sensitive variable sensor for providing a proportional signal, whereby depression of said at least one of the finger depressible buttons provides a proportional signal representing a level of depressive pressure applied.

20. An image controller according to claim 19 wherein said pressure-sensitive variable sensor includes an electrically conductive pill carried by a dome shaped member; said electrically conductive pill comprising deformable material and having a convexed surface shape, whereby when said button is depressed with increasing input pressure the convexed shaped material deforms to contact additional surface area to provide additional conductivity changes.

21. (twice amended) A method of interacting with an image controller controlling at least a three-dimensional object image, comprising:

receiving a first signal from said image controller, said first signal derived from a pressure-sensitive analog sensor associated with a single independent depressible button positioned on said image controller, said first signal used to control said three-dimensional object image, and

sending a second signal to said image controller, said second signal used to provide an active tactile feedback vibration felt by a hand of a human user, the act of sending said second signal results from virtual contact of said three-dimensional object image caused by the act of receiving said first signal.

22. (once amended) A method of interacting with an image controller according to claim 21 further comprising

receiving a third signal and a fourth signal, the third and fourth signals used as three-dimensional viewpoint navigating commands.

23. (once amended) A method of interacting with an image controller according to claim 22 wherein the third and fourth signals are provided by two bi-directional proportional sensors located within said image controller.

24. (once amended) A method of interacting with an image controller according to claim 23 wherein a fifth signal is provided by a third bi-directional proportional sensor and a sixth signal is provided by a fourth bi-directional proportional sensor located within said image controller; and said button having a tactile resilient structure for providing a user discernable tactile feedback upon depression of said button; at least two of the sensors connected to at least one sheet.

25. (once amended) A method of using an image controller controlling at least a three-dimensional object image, comprising the acts:

receiving a three-dimensional object command from at least one of four bi-directional proportional sensors, and

sending an active tactile feedback command to said image controller, the act of sending results from virtual contact of the three-dimensional object caused by the act of receiving, whereby the sending of the active tactile feedback command causes vibration to be felt by a hand of a human user, the vibration related to contacting of the three-dimensional object image.

26. A method of using an image controller according to claim 25 further including the act

receiving a three-dimensional viewpoint navigating command from said image controller.

27. A method of using an image controller according to claim 26 wherein the three-dimensional commands are provided at least in part by four unidirectional sensors located in said image controller.

28. A method of using an image controller according to claim 27 wherein the three-dimensional commands are provided at least in part by activation of two single independent buttons

positioned to activate proportional sensors located within said image controller.

29. A method of using an image controller according to claim 28 wherein at least one of said buttons has a tactile resilient structure for providing a user discernable tactile feedback upon depression of the button; at least two of the sensors connected to at least one sheet.

30. A method of interacting with an image controller controlling electronic game imagery, comprising the acts:

receiving a command from at least one of four bi-directional proportional sensors located in said image controller; and

receiving a command from at least one of four unidirectional sensors located in said image controller; and

receiving a command from at least one of two single independent buttons positioned to activate proportional sensors connected by a sheet within said image controller, said buttons having a resilient tactile structure providing a tactile feedback to at least one finger of a hand of a human user;

sending an active tactile feedback command to said image controller, the active tactile feedback command causes a motor to rotate an offset weight located in said image controller causing a vibration to be felt by the hand of the human user.

31. A method of interacting with an image controller controlling electronic game imagery, comprising the acts:

receiving a command from at least one of four bi-directional proportional sensors located in said image controller; and

receiving a command from at least one of four unidirectional sensors located in said image controller; and

receiving a command from at least one of two independent pivotal buttons structured to activate proportional sensors located within said image controller;

sending an active tactile feedback command to said image

controller, the active tactile feedback command causes a motor to rotate an offset weight located in said image controller causing a vibration to be felt by a hand of a human user.

32. (once amended) A method according to claim 31 further comprising

using at least some of the commands to control the electronic game, and said sending is according to simulated contact in the electronic game.

33. A method of interacting with an image controller controlling electronic game imagery shown on a television, said image controller comprising a hand held housing, four bi-directional proportional sensors, four unidirectional sensors, two unidirectional proportional sensors, and a motor with offset weight; the method comprising:

receiving a first signal from at least one of the sensors, the first signal useful for controlling the imagery; and

sending an active tactile feedback signal to said image controller, the active tactile feedback signal causes said motor to rotate said offset weight causing a vibration to be felt by the hand of the human user.

34. A method of interacting with an image controller according to claim 33 wherein said two unidirectional proportional sensors are connected by at least one sheet and said two unidirectional proportional sensors produce a user discernable snap tactile feedback felt by the user's finger upon sensor activation.

35. A controller used in controlling imagery of an electronic game, the controller comprising:

a housing; associated with the housing are a plurality of input members for receiving inputs from a user; the input members positioned to activate

sensors for sensing the inputs by the user and providing outputs related to the sensed inputs, the outputs at least in part useful for controlling the electronic game;

a first of the input members is a stick which is depressible toward the housing, the stick is additionally moveable on two mutually perpendicular axes,

a second of the input members is a finger depressible button, the button is associated with a proportional pressure-sensitive variable output sensor of the sensors, the proportional pressure-sensitive variable output sensor for receiving varying input force and providing a variable output representing the varying input force;

a third of the input members is a rotatable member; structure forming a part of the controller for providing feedback detectable by the user when making inputs.

36. A controller used in controlling imagery of an electronic game, the controller comprising:

a housing; associated with the housing are a plurality of input members for receiving inputs from a user; the input members positioned to activate

sensors for sensing the inputs by the user and providing electrical outputs related to the sensed inputs, the outputs at least in part useful for controlling the electronic game;

a first of the input members is a member moveable on two mutually perpendicular axes;

a second of the input members is a finger depressible first button, the first button is associated with a proportional pressure-sensitive variable output sensor of the sensors, the proportional pressure-sensitive variable output sensor for receiving varying input force and providing a variable output representing the varying input force;

a third of the input members is a rotatable member;

a fourth of the input members is a finger depressible second button, the second button is associated with an On/Off output

sensor of the sensors.

37. A controller according to claim 36 further comprising the first of the input members is depressible, for activating a tactile sensor of the sensors, toward the housing along an axis mutually perpendicular to said two mutually perpendicular axes.

38. A controller according to claim 37 further comprising a motor with weight mounted in said controller for providing active tactile feedback.

39. A controller used in controlling imagery shown on a display, the display connected to an image generation device, the controller comprising:

- a housing; associated with the housing are a plurality of members for receiving physical inputs from a human user; the members for receiving physical inputs are positioned to activate sensors for sensing the inputs by the user and providing outputs related to the sensed inputs, the outputs at least in part useful for controlling the imagery;

- a first of the members for receiving physical inputs is a stick moveable on two axes,

- a second of the members for receiving physical inputs is a finger depressible first button, the first button is associated with a first proportional pressure-sensitive variable output sensor of the sensors, the first proportional pressure-sensitive variable output sensor for receiving varying input force and providing a variable output representing the varying input force;

- a third of the members for receiving physical inputs is a finger depressible second button, the second button is associated with a second proportional pressure-sensitive variable output sensor of the sensors, the second proportional pressure-sensitive variable output sensor for receiving varying input force and providing a variable output representing the varying input force;

- a fourth of the members for receiving physical inputs is a

finger depressible third button, the third button is associated with an On/Off output sensor of the sensors.

40. A controller according to claim 39 further comprising a motor with weight mounted in said controller for providing active tactile feedback.

41. A hand-held controller for use in controlling an electronic game, the controller comprising:

a housing sized to be hand-held; associated with the housing are a plurality of

structural elements for receiving inputs from a human user; the structural elements for receiving inputs are positioned to activate

sensors for sensing the inputs by the user and providing outputs related to the sensed inputs, the outputs useful for controlling the electronic game;

a first of the structural elements for receiving the inputs is a stick element moveable on two axes and structured to activate at least a first proportional sensor and a second proportional sensor of the sensors,

a second of the structural elements for receiving the inputs is a finger depressible first button, the first button is associated with a third proportional sensor of the sensors, the third proportional sensor for receiving varying input and providing a variable output representing the varying input;

a third of the structural elements for receiving the inputs is a finger depressible second button, the second button is associated with a fourth proportional sensor of the sensors, the fourth proportional sensor for receiving varying input and providing a variable output representing the varying input;

a fourth of the structural elements is a function key positioned to activate an On/Off sensor of the sensors.

42. A controller for use in controlling imagery of an electronic game, the controller comprising:

- a housing;

- a plurality of members associated with the housing and exposed for receiving inputs from a human user; the plurality of members positioned to activate

- sensors for sensing the inputs by the user and providing outputs related to the sensed inputs, the outputs at least in part useful for controlling the electronic game;

- a first member of the plurality of members is a first button, the first button is associated with a first proportional pressure-sensitive variable output sensor of the sensors, the first proportional pressure-sensitive variable output sensor for receiving varying input force and providing a variable output representing the varying input force;

- a second of the plurality of members is a second button, the second button is associated with a second proportional pressure-sensitive variable output sensor of the sensors, the second proportional pressure-sensitive variable output sensor for receiving varying input force and providing a variable output representing the varying input force;

- a third member of the plurality of members is a stick member moveable in three axes,

- a fourth member of the plurality of members is moveable in three axes,

- structure within the controller for providing feedback detectable by the user as a result of making the inputs.

43. A controller according to claim 42 further comprising said structure within the controller for providing feedback detectable by the user includes a motor with weight.

44. A hand-held controller for use in controlling electronic imagery, the controller comprising:

- reference structure associated with a plurality of moveable

structural members, the structural members for receiving physical inputs from a human user; the structural members are positioned to activate

sensors for sensing the physical inputs by the user and providing electrical outputs related to the sensed inputs, the outputs at least in part useful for controlling the electronic imagery;

a first of the structural members is a stick member moveable on three axes;

a second of the structural members is a finger depressible first button, the first button is associated with a first proportional pressure-sensitive variable output sensor of the sensors, the first proportional pressure-sensitive variable output sensor for receiving varying input force and providing a variable output representing the varying input force;

a third of the structural members is a finger depressible second button, the second button is associated with a second proportional pressure-sensitive variable output sensor of the sensors, the second proportional pressure-sensitive variable output sensor for receiving varying input force and providing a variable output representing the varying input force.

45. A hand-held controller according to claim 44 further comprising structure mounted within the controller for providing feedback detectable by the user.

46. A hand-held controller according to claim 45 wherein said structure mounted within the controller for providing feedback detectable by the user is a snapping mechanism which creates a snap when said stick member is pushed toward said reference structure.

47. A hand-held controller according to claim 45 further comprising the structure providing feedback detectable by the user is active.

48. A hand-held controller according to claim 45 further comprising the structure providing feedback detectable by the user is passive.

49. A controller for use in controlling imagery of an electronic game, the controller comprising:

a housing; associated with the housing are a plurality of input members for receiving inputs from a user; the input members positioned to activate

sensors for sensing the inputs by the user and providing outputs related to the sensed inputs, the outputs at least in part useful for controlling the electronic game;

a first of the input members includes a shaft which is depressible toward the housing, depression of the shaft by a user input activating a sensor of the sensors which provides a feedback sensation detectable by the user, the shaft is additionally moveable on two mutually perpendicular axes,

a second of the input members is a finger depressible individual first button, the individual first button is associated with a first proportional pressure-sensitive variable output sensor of the sensors, the first proportional pressure-sensitive variable output sensor for receiving varying input force and providing a variable output representing the varying input force;

a third of the input members is a finger depressible individual second button, the individual second button is associated with a second proportional pressure-sensitive variable output sensor of the sensors, the second proportional pressure-sensitive variable output sensor for receiving varying input force and providing a variable output representing the varying input force;

structure associated as part of the controller for providing active tactile feedback detectable by the user when making at least some of the inputs; and

structure associated as part of the controller for providing break-over feedback detectable by the user when making at least some of the inputs.

50. A controller for use in controlling imagery of an electronic game, the controller comprising:

- a housing; associated with the housing are a plurality of input members for receiving inputs from a user; the input members positioned to activate

- sensors for sensing the inputs by the user and providing electrical outputs related to the sensed inputs, the outputs at least in part useful for controlling the electronic game;

- a first of the input members is a member moveable on two mutually perpendicular axes;

- a second of the input members is a finger depressible button, the button is associated with a proportional pressure-sensitive variable output sensor of the sensors, the proportional pressure-sensitive variable output sensor for receiving varying input force and providing a variable output representing the varying input force;

- a graphics generation device, the graphics generation device generating the imagery of the electronic game, the imagery is shown on a display connected to the image generation device.

51. A controller for controlling an image generation machine, said controller comprising:

- a housing; supported by the housing is

- an input member with associated sensors for detecting movement of said input member, said input member moveable on up to three axes; and

- a plurality of finger depressible individual buttons with associated sensors; and

- at least one of the buttons is associated with a first proportional pressure-sensitive variable output sensor of the sensors, the first proportional pressure-sensitive variable

output sensor for receiving varying input force and providing a variable output representing the varying input force.

52. A controller according to claim 51 comprising said housing is hand-held.

53. An image controller comprising:

an input member with associated sensors for receiving manual control inputs, said input member moveable relative to a reference member on at least two mutually perpendicular axes; and a plurality of finger depressible individual buttons with associated proportional pressure-sensitive variable output sensors; and

tactile feedback for providing tactile sensation to be felt by a user operating said controller.

54. An image controller according to claim 53 in which at least one of the finger depressible individual buttons is structured with a resilient dome cap.

55. An image controller according to claim 54 in which said image controller is connected to an image generation device.

56. An image controller according to claim 55 in which said image generation device includes a television based electronic game.

57. An image controller according to claim 56 wherein said tactile feedback comprises an electric motor and offset weight.

58. An image controller according to claim 18 in which a plunger is positioned above said dome cap, said plunger comprising a non-conductive rigid plastic material.

59. An image controller according to claim 56 in which said

tactile feedback is passive.

60. An image controller comprising:
a first input member with associated sensors, and moveable on at least two axes;
a second input member with associated sensors, and moveable on at least two axes;
a plurality of finger depressible button input members with associated sensors;
a first button of said button input members is positioned to activate a first proportional pressure-sensitive sensor;
a second button of said button input members is positioned to activate a second proportional pressure-sensitive sensor;
tactile feedback structure;
a housing supports at least in part: the first and second input members, the first and second input member sensors, the button sensors and the first and second button input members, and the tactile feedback structure.

61. An image controller according to claim 60 wherein said tactile feedback structure is at least a tactile turn-on type associated with the button input members.

62. An image controller according to claim 61 wherein said tactile feedback structure provides at least active tactile feedback.

63. An image controller according to claim 62 wherein said active tactile feedback structure comprises a motor and offset weight.

64. A controller for controlling a television based game, the controller comprising:
a housing;

a first element rotatable about a first axis and a second axis for controlling two axes of the game, said first element depressible toward said housing along a third axis for controlling the game;

a clicking mechanism providing to a user a detectable feedback when said first element is depressed toward said housing.

65. A controller for controlling a television based game, the controller comprising:

a housing at least indirectly supporting

a first element rotatable about a first axis and a second axis for controlling two axes of the game, said first element depressible toward said housing along a third axis for activating a sensor;

and

a button positioned to be depressible to activate a pressure-sensitive sensor for providing a variable output useful for variable control of the game.

66. A controller for controlling a television based game, the controller comprising:

a housing at least indirectly supporting

a first element rotatable about a first axis and a second axis for controlling two axes of the game, said first element depressible toward said housing along a third axis for controlling the game; and

a second element for controlling two axes of the game, said second element depressible toward said housing along a third axis for controlling the game; and

a first button positioned to be depressible with variable force to activate a first pressure-sensitive sensor for providing a variable output useful for variable control of the game; and

a second button positioned to be depressible with variable force to activate a second pressure-sensitive sensor for

providing a variable output useful for variable control of the game; and

a third button positioned to be depressible to activate an On/Off sensor for providing an On/Off output useful for controlling an On/Off function of the game; and

a motor with weight for providing active tactile feedback.

67. A controller for controlling a television based game, the controller comprising:

a housing, said housing shaped to be hand held; said housing at least in part supporting

a two axes first actuator rotatable about a first axis and a second axis for controlling two axes of the game, said first actuator depressible toward said housing along a third axis;

a clicking mechanism providing to a user a detectable feedback when said first actuator is depressed toward said housing;

a two axes second actuator for controlling two axes of the game;

a finger depressible first button positioned to activate an On/Off sensor; and

a finger depressible second button positioned to activate a proportional sensor.

68. A hand-held controller in communication with a image generation machine for controlling an electronic game, the controller comprising:

a housing sized to be hand-held; associated with the housing are a plurality of

structural elements for receiving inputs from a human user; the structural elements for receiving inputs are positioned to activate

sensors for sensing the inputs by the user and providing outputs related to the sensed inputs, the outputs useful for controlling the electronic game;

a first of the structural elements for receiving inputs is a finger depressible first button, the first button is associated with a first proportional sensor of the sensors, the first proportional sensor for receiving varying input and providing a variable output representing the varying input;

a second of the structural elements for receiving inputs is a finger depressible second button, the second button is associated with a second proportional sensor of the sensors, the second proportional sensor for receiving varying input and providing a variable output representing the varying input;

a third of the structural elements is a function key positioned to activate an On/Off sensor of the sensors;

a fourth of the structural elements for receiving inputs is a stick element controllable on two axes.